

*U.S. DEPARTMENT OF COMMERCE  
Office of Inspector General*

---



*National Institute of  
Standards and Technology  
and  
National Oceanic and Atmospheric  
Administration*

***NIST and NOAA Monitor  
Their Recovery Act Programs,  
but Performance Metrics Need to  
Measure Outcomes***

*Final Report No. ARR-19881*

*May 21, 2010*

**For Public Release**

*Office of Audit and Evaluation*

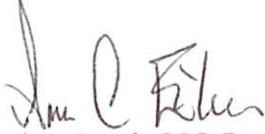




May 21, 2010

MEMORANDUM FOR: Dr. Patrick D. Gallagher, Director  
National Institute of Standards and Technology

Dr. Jane Lubchenco, Administrator  
National Oceanic and Atmospheric Administration

FROM: Ann C. Eilers   
Sr. Advisor and Project Lead, OIG Recovery Act Task Force

SUBJECT: *Programs' Progress Monitored to Mitigate Risk, but Metrics Need to Measure Outcomes*, Final Report No. ARR-19881

We are providing you with our final report on NIST's and NOAA's implementation of American Recovery and Reinvestment Act of 2009 performance measurement requirements.

We found that both NOAA and NIST have established mechanisms to monitor the progress of Recovery Act programs to more actively manage risk. The Recovery Act's emphasis on accountability and performance has resulted in improved management capabilities and systems, especially with respect to nonfinancial risk management. However, while the bureaus created or improved existing systems to keep track of indicators of progress—e.g., dollars spent, milestones met, jobs created—they had not developed measures of substantive outcomes in order to assess specific program goals or the broader public benefits of significant programs funded by the Recovery Act. We discussed our findings with NOAA's chief financial officer (CFO) on February 22, 2010, and with NIST'S deputy CFO and other NIST officials on February 25; we then provided a draft report to the bureaus on April 16.

NOAA's April 22 response to our draft report says that NOAA agrees with the report and has already begun to modify its Recovery Act performance metrics to address the report's recommendation. NIST's May 14 response reemphasized the challenges we discussed in the report regarding measuring core science programs. However, NIST agreed that its performance metrics for the Scientific and Technical Research Services equipment program should be strengthened and that it would develop an appropriate set of intermediate measures. We summarize both bureaus' responses in our report.

Within 60 days from the date of this memorandum, please provide us with an action plan that responds to our recommendation. Please also accept our thanks to NOAA and NIST officials for the courtesies shown to us during the inspection. If you have any questions, please contact me at (202) 482-4328 or John Bunting at (202) 527-0635.

Attachment

cc: David Robinson, Chief Financial Officer, NIST  
Stephen Kunze, Deputy Chief Financial Officer, NIST  
Rachel Kinney, Recovery Act and Audit Liaison, NIST  
Maureen Wylie, Chief Financial Officer, NOAA  
Mack Cato, Audit Liaison, NOAA  
Ronald Rhodes, Recovery Act Liaison, NOAA  
Lisa Casias, Deputy Chief Financial Officer/Director for Financial Management, Office  
of Financial Management  
Ellen Herbst, Senior Adviser for Recovery Implementation, Office of the Vice President



# Report In Brief

U.S. Department of Commerce Office of Inspector General

May 21, 2010



## Why We Did this Review

The American Recovery and Reinvestment Act of 2009 and the Office of Management and Budget's (OMB) implementation guidance require agencies to monitor the progress of Recovery Act programs to identify areas of, and address concerns about, high risk or low performance. OMB also requires agencies to include accountability objectives as part of the risk-mitigation process and to develop quantifiable performance measures that address the use of Recovery Act funds to meet the act's goals.

We examined NIST's \$200 million Scientific and Technical Research Services (STRS) account and NOAA's \$600 million Procurement, Acquisition, and Construction account to determine whether (1) the bureaus are monitoring the progress of certain programs funded by the Recovery Act; (2) NIST and NOAA have mitigated risks or addressed schedule- or cost-related concerns; and (3) the bureaus' performance metrics comply with OMB requirements.

## Background

On February 17, 2009, the President signed the Recovery Act into law. The act requires an unprecedented degree of transparency and accountability from agencies that receive funding, and sets forth specific responsibilities for the agencies to manage funds and program operations. Five operating units in the Department of Commerce, plus the Office of Inspector General (OIG), received Recovery Act funds.

OIG has been proactive in our oversight of Commerce's Recovery Act programs and activities, including the bureaus' implementation of the act's performance measurement requirements.

## American Recovery and Reinvestment Act

### ***NIST and NOAA Monitor Their Recovery Act Programs, but Performance Metrics Need to Measure Outcomes (ARR-19881)***

## What We Found

In order to more actively manage risk, the National Institute of Standards and Technology (NIST) and the National Oceanic and Atmospheric Administration (NOAA) have established mechanisms to monitor the progress of Recovery Act programs. The Recovery Act's emphasis on accountability and performance has resulted in improved management capabilities and systems, especially with respect to nonfinancial risk management. These improvements have the potential to extend past the Recovery Act into other programs.

However, while the bureaus have created new systems or improved existing systems to keep track of indicators of progress—e.g., dollars spent, milestones met, jobs created—they have not developed measures of substantive outcomes that assess specific program goals or the broader public benefits of significant programs funded by the Recovery Act.

## What We Recommended

NOAA and NIST should improve their performance metrics for the more significant Recovery Act programs, focusing on intermediate outcomes that assess the programs' benefits. For example, performance metrics should track whether an investment has improved the body of knowledge in a particular field, disseminated newly developed tools and models, supported a research or technological innovation, or made other advancements in science and technology for the public's benefit.

We issued a draft report on our findings in April 2010, and gave the bureaus the opportunity to respond. NOAA agreed with the report and has already begun to modify its Recovery Act performance metrics to address our recommendation. NIST's response reemphasized the challenges we discussed in the report regarding measuring core science programs. However, NIST agreed that some of its performance metrics for the STRS equipment program should be strengthened, and that it would develop an appropriate set of intermediate measures.

## Introduction

The American Recovery and Reinvestment Act of 2009 and the Office of Management and Budget's (OMB) implementation guidance require agencies to monitor the progress of Recovery Act programs to identify areas of, and address concerns about, high risk or low performance. OMB also requires agencies to include accountability objectives as part of the risk-mitigation process (see box) and to develop quantifiable performance measures that address the use of Recovery Act funds to meet the act's goals.

The U.S. Government Accountability Office (GAO) defines performance measurement as "the ongoing monitoring and reporting of program accomplishments, particularly progress toward pre-established goals . . . typically conducted by program or agency management."<sup>1</sup> Performance measurement during a project involves the timely, cost-effective oversight and management of a program's schedule, as well as its milestone progress and possible risks to its completion.

Performance measurement often addresses the type or level of program activities conducted

(process), the direct products and services delivered by a program (outputs), and the results of those products and services (outcomes).

Performance measurement also focuses on whether a program has achieved its objectives, often expressed as measurable performance standards. An agency's inattention to a program's schedule, milestone progress, and risks inhibits its ability to mitigate those risks and take timely action to support complicated or struggling programs.

Performance-based data demonstrate whether, in what ways, and why a program is working. Such data inform decisions by senior leadership, program managers, the executive branch, and Congress. Citizens also want to know that Recovery Act funds are awarded fairly and promptly, along with the public benefits of these investments.

The objectives of this review were to (1) determine whether NIST and NOAA have taken action to monitor the progress of certain programs funded by the Recovery Act in order to mitigate risk; (2) determine whether NIST and

NOAA have mitigated risks or addressed schedule- or cost-related concerns; and (3) assess whether the bureaus' performance metrics comply with OMB requirements. The Office of Inspector General (OIG) assessed NIST's \$220-million Scientific and Technical Research

### **Recovery Act Accountability Objectives**

- Funds are awarded and distributed in a prompt, fair, and reasonable manner.
- Projects funded under this act avoid unnecessary delays and cost overruns.
- Program goals are achieved, including specific program outcomes and improved results on broader economic indicators.
- The recipients and uses of all funds are transparent to the public, and the public benefits of these funds are reported clearly, accurately, and in a timely manner.
- Funds are used for authorized purposes and instances of fraud, waste, error, and abuse are mitigated.

Source: OMB Memorandum M-09-15

<sup>1</sup>U. S. Government Accountability Office, *Performance Measurement and Evaluation—Definitions and Relationships* (GAO-05-739SP, May 2005).

Services (STRS) account and NOAA's \$600-million Procurement, Acquisition, and Construction (PAC) account (see tables 1, 2, and 3 on pages 4, 7, and 8, respectively).

We conducted our work at NOAA in Silver Spring, Maryland, and at NIST in Gaithersburg, Maryland. We met with NOAA and NIST program officials to discuss their development of performance measures to meet the compliance requirements of the Recovery Act as described in OMB Memorandum M-09-15, *Updated Implementing Guidance for the American Recovery and Reinvestment Act of 2009*. We reviewed policies, procedures, plans, and metrics for monitoring and reporting the progress of certain Recovery Act programs. Also, we assessed relevant management information systems that support Recovery Act performance measurement tracking and reporting.

We performed this review from January through April 2010, under authority of the Inspector General Act of 1978, as amended; Department Organization Order 10-13, dated August 31, 2006, as amended; and in accordance with the *Quality Standards for Inspections* (revised January 2005) issued by the President's Council on Integrity and Efficiency.

## **Summary of Findings**

In order to more actively manage risk, NOAA and NIST have established mechanisms to monitor the progress of Recovery Act programs. The Recovery Act's emphasis on accountability and performance has resulted in improved management capabilities and systems at these bureaus, especially with respect to nonfinancial risk management. These improvements have the potential to extend past the Recovery Act into other programs. However, while NOAA and NIST have created new systems or improved existing systems to keep track of indicators of progress—e.g., dollars spent, milestones met, jobs created—they have not developed measures of substantive outcomes in order to assess whether specific program goals are being achieved or the broader public benefits of significant programs funded by the Recovery Act.

## **Findings and Recommendation**

### **I. NIST and NOAA Have Established Mechanisms to Monitor the Progress of Programs to More Actively Manage Risk**

For Recovery Act investments, OMB required each agency to include in its program-specific plans a delivery schedule with “milestones for major phases of the program’s activities (e.g., the procurement phase, planning phase, project execution phase . . .) with planned delivery date(s).”<sup>2</sup> As part of the risk management process, agencies are required to identify and mitigate the potential risk of “unnecessary delays [in the delivery schedule] and cost overruns.”<sup>3</sup> To assist in determining how well agencies are dealing with this risk, they are required to track program progress to determine whether funds are being obligated and expended in a timely manner.<sup>4</sup>

OMB provides guidance on the intersection between performance measurement and risk management, stating that agencies must develop measures of “expected quantifiable outcomes consistent with the intent and requirements of [the Recovery Act] and the risk management requirements of Section 3 [of the OMB guidance].”<sup>5</sup> Specifically, “[a]gencies should prepare risk mitigation plans for those risks with the highest probability of occurrence and the greatest impact [on program performance] if not mitigated [and] whenever possible; agencies should identify quantifiable measures of performance, including ranges of acceptable and unacceptable performance.”<sup>6</sup>

NIST and NOAA have taken positive steps to comply with these OMB requirements for their Recovery Act investments, as detailed in table 1. For example, nonfinancial risk management has become a key factor for both NIST and NOAA officials working on Recovery Act programs, who indicated that increased attention to risk and more regular discussions about how to mitigate a risk or resolve a problem have helped its bureaus set priorities and balance competing concerns. Many officials also pointed to the consistent use of project management tools, either the software used by NOAA or the database developed by NIST, which have informed and complemented the risk assessment.

---

<sup>2</sup>OMB Memorandum M-09-10 at 2.8(e); OMB Memorandum M-09-15 at 2.8(e).

<sup>3</sup>OMB Memorandum M-09-15 at 3.1. This risk must be monitored and reassessed by the agency throughout the period of availability of Recovery Act funds. OMB Memorandum M-09-15 at 3.11. In addition, Section 1512 of the Recovery Act requires recipients of funds to report to the agency on the completion status of projects and activities.

<sup>4</sup>See OMB Memorandum M-09-15 at 3.7.

<sup>5</sup>OMB Memorandum M-09-15 at 2.8(g). With respect to specific programs, the risk management requirements of Section 3 require agencies to identify, prioritize, and plan to mitigate programmatic risks. See OMB Memorandum M-09-15 at 3.9.

<sup>6</sup>OMB Memorandum M-09-15 at 3.12.

**Table 1: Mechanisms Established by NIST and NOAA to Monitor Program Progress and Manage Risk**

Source: OIG analysis based on bureau data

Recovery Act Account	Mechanism	OMB and Recovery Act Requirements				Other Benefits
		Track Progress Against Timely Expenditure of Recovery Act Funds		Risk Assessment	Quantifiable Performance Measures	
		Milestones for Program Activity	Identify and Mitigate Risk of Delay and Cost Overruns			
<p><i>NIST Scientific and Technical Research Services (STRS)</i> Account: \$220 million plus \$30 million in transfers</p>	<ul style="list-style-type: none"> <li>Recovery Act Steering Committee</li> <li>Program Management Office</li> <li>Database for tracking obligations and program progress</li> </ul>	<p>Monthly action plans address funds' obligation status, milestones, risk identification, and risk assessment</p>	<p>Steering Committee meets as needed to identify, prioritize, and mitigate emerging risks, focusing on obligation</p>	<ul style="list-style-type: none"> <li>Contractor develops and implements risk management system</li> <li>All Recovery Act projects are assessed for risk (low/medium/high)</li> </ul>	<ul style="list-style-type: none"> <li>Counts jobs created</li> <li>Tracks acquisition milestones, including obligations and expenditures<sup>a</sup></li> </ul>	<p>Permanent governance improvement:</p> <ul style="list-style-type: none"> <li>First time nonfinancial risk systematically measured and managed</li> <li>Potential to extend past Recovery Act</li> </ul>
<p><i>NOAA Procurement, Acquisition, and Construction (PAC)</i> Account: \$600 million</p>	<ul style="list-style-type: none"> <li>Accountability Oversight Board</li> <li>Web-based executive dashboard</li> <li>Tracking of selected higher risk programs</li> </ul>	<p>Program managers present status updates on budget, risk management, project progress, and performance measurement to Oversight Board</p>	<ul style="list-style-type: none"> <li>Oversight Board meets weekly to review projects and intervenes as necessary</li> <li>Action items follow each meeting</li> <li>Recovery Act program manager monitors follow-up</li> </ul>	<ul style="list-style-type: none"> <li>Board has elevated higher risk projects for heightened scrutiny</li> <li>Board has actively coordinated with external stakeholders and mitigated cascading effects of early delay</li> </ul>	<p>Close tracking to be extended to all Recovery Act projects</p>	

<sup>a</sup> As discussed in finding II, these performance measures do not generally support measurement of performance outcomes.

One positive consequence of the Recovery Act's increased emphasis on accountability and performance is that NIST's and NOAA's risk management capabilities (especially nonfinancial

risk management) and project management capacities are improving. Before the Recovery Act, NOAA managed construction and repair of facilities and vessels in accordance with existing OMB requirements and current business practices in those industries, and used project delivery schedules and risk assessments. Nonfinancial risk management, however, was less mature at NOAA than its financial risk management capacity. While NIST’s financial risk management expertise was reportedly well developed, several NIST officials indicated that its nonfinancial risk management capabilities were less developed when the Recovery Act became law. Likewise, NIST officials acknowledged that it traditionally did not have strong project management experience, except for some recent improvements in the facilities construction and repair areas.

NIST and NOAA officials offered a few positive examples of schedule-delay risks mitigated or cost overruns averted due to early detection and subsequent follow-up. While the examples provided have had minor impact so far, they do demonstrate that increased attention to schedule and risk can help to avoid unnecessary delays and cost overruns. At this point, however, with such a small percentage of Recovery Act funds expended from the NIST STRS and NOAA PAC accounts, it may be too soon to see more tangible benefits of this enhanced oversight until more funds are in the hands of contractors and grantees.

## II. Most NOAA PAC and NIST STRS Performance Metrics Do Not Measure Outcomes

As part of its Recovery Act performance plans, OMB requires each agency to measure “expected quantifiable outcomes consistent with the intent and requirements of the legislation and risk management. . .”<sup>7</sup> OMB further states, “[E]ach outcome [must be] supported by a corresponding quantifiable output(s)—agencies must specify the length of the period between measurements (e.g., monthly, quarterly), measurement methodology, and how results will be made readily assessable to the public.”<sup>8</sup> Agencies are required to make this information publicly available. The Recovery Act also requires recipients to report on the creation and retention of jobs as well as the completion status of projects and activities.<sup>9</sup>

*“Government operates more effectively  
when it focuses on outcomes...”*

OMB 2011 Budget Submission Guidance  
“Performance and Management,”  
January 8, 2010

In April 2009, NIST and NOAA submitted their Recovery Act plans to Congress, which approved the plans—including the performance measures—the following month.<sup>10</sup> A key metric required by the Recovery Act is to track job creation, which is considered an outcome measure. All NIST and NOAA Recovery Act programs that were assessed in this review comply with this Recovery Act requirement.

<sup>7</sup>OMB Memorandum M-09-15 at 2.8(g).

<sup>8</sup>OMB Memorandum M-09-15 at 2.8(g).

<sup>9</sup>Recovery Act, 1512(c)(3)(B)-(D). This review does not address reporting or job creation or retention.

<sup>10</sup>Some Recovery Act performance measures are the same as the Government Performance and Results Act of 1993 (GPRA) measures. In 2005, GAO wrote, “Seeking to promote improved federal management and the increased efficiency and effectiveness of federal programs, GPRA instituted a government-wide requirement for agencies to set goals and report annually on program performance,” and in enacting GPRA, “Congress expressed frustration that executive branch and congressional decision making was often hampered by the lack of good information on the results of federal program efforts.” [See footnote 1.]

Other than counting jobs, however, which is ultimately the main gauge of the Recovery Act's success, most of the NIST and NOAA programs reviewed do not have outcome-oriented performance measures. Therefore, NIST and NOAA are not assessing whether program goals, specific program outcomes, and improved results are achieved. In fact, many of the Recovery Act measurements that were submitted by NIST and NOAA (and approved by OMB) are not performance measures as envisioned in the Recovery Act guidance or as defined by GAO. Rather, they are measures of the percentage of obligations (such as NIST STRS projects) or the completion of a schedule's milestones (such as NOAA facility and vessel construction and repair projects). While both are crucial aspects to track in project and financial management, these

***Agencies will take actions beyond standard practices to adapt current performance evaluation and review processes to include the ability to report on program and economic outcomes.***

—OMB Memorandum M-09-15,  
Grants, section 5.4

***Agencies will give heightened management attention to Recovery Act acquisition planning to achieve mitigation of schedule cost and performance risk, and define contract requirements that deliver meaningful and measurable outcomes.***

—OMB Memorandum M-09-15,  
Contracts, section 6.1

metrics do not measure expected outcomes and do not satisfy the Recovery Act's intent to achieve program goals by meeting these outcomes.

NOAA uses measures of a program's progress, such as a schedule's milestones that have been achieved, as its performance measures in five out of eight PAC programs. For example, in the Facility Maintenance and Repair program, the performance measures focus on specific outputs, such as "Percentage of Planned Milestones Met," and these metrics are monitored by the program manager and NOAA's Accountability Oversight Board as performance measures. While measuring the progress of program schedule is vital, these milestone-related performance metrics do not measure expected quantifiable outcomes. Next Generation Radar (NEXRAD) is the notable exception among the NOAA PAC programs, with seven outcome-oriented performance measures focused on improving severe weather forecasting.<sup>11</sup> For example, NEXRAD measures the lead time and accuracy of severe weather warnings for flash floods, tornados, and winter storms.

Tables 2 and 3 show several ways that NIST and NOAA are tracking the progress of Recovery Act programs, monitoring Recovery Act spending and project milestones, and counting jobs. The bureaus' Recovery Act performance metrics, however, are still not outcome oriented. For example, NOAA could develop a performance metric for its vessel construction or repair activities that would measure its ability to more effectively manage fisheries' stocks. NIST could develop an outcome-oriented performance metric that would measure the advances made in a particular scientific field due to NIST's purchases and use of highly technical scientific equipment. In such ways, NIST and NOAA would develop performance measures that are aligned with the purposes of the investments, as outlined in their spending plans.

<sup>11</sup>These are the same as the program's GPRA measures. As another example, NOAA's GPRA Goal 3 measures climate outcomes, relevant to the Recovery Act's High Performing Computers investment.

**Table 2: NIST Tracks Progress of Recovery Act Programs, but Most Performance Metrics Do Not Measure Outcomes**

NIST Scientific and Technical Research Services (STRS) Account (\$ millions)		Intended Purpose (Recovery Act Spending Plan)	Recovery Act Outcome Measures Established?	Measures Jobs Created or Saved?	Spending Progress and Milestones Tracked?
Advanced Scientific Equipment	\$119	Strengthen programs that enable long-term economic growth through innovation	No	Yes	Yes
Measurement Science and Engineering Grants and Research Fellowships	77	Advance NIST research through innovation; fellowship awardees will advance NIST research	No	Yes	Yes
Other Remaining Programs, including Research and IT Infrastructure Contracts, Standards for Health Information Technology <sup>a</sup> , and SmartGrid Standards <sup>b</sup>	54	Create tools to help vendors test their health IT products; support development of interoperable Smart Grid; improve NIST IT infrastructure, etc.	No	Yes	Yes
<b>Total</b>	<b>\$250</b>				

Source: OIG analysis of NIST data

<sup>a</sup>Transfer from Department of Health and Human Services

<sup>b</sup>Transfer from Department of Energy

**Table 3: NOAA Tracks Progress of Recovery Act Programs, but Most Performance Metrics Do Not Measure Outcomes**

NOAA Procurement, Acquisition and Construction (PAC) Account (\$ millions)		Intended Purpose (Recovery Act Spending Plan)	Recovery Act Outcome Measures Established?	Measures Jobs Created or Saved?	Spending Progress and Milestones Tracked?
Climate Computing and Modeling	\$170	Improve the accuracy of seasonal climate and global climate change assessments	No	Yes	Yes
Pacific Regional Center	142	Improve operations and mission performance; operational savings; greater program collaboration within NOAA and externally	No	Yes	Yes
Southwest Fisheries Science Center Laboratory Replacement	102	Enable NOAA and partners to benefit from strategic and functional relationships with local research and educational organizations	No	Yes	Yes
Vessel Construction	78	Improve the ability to more accurately manage fisheries stocks	No	Yes	Yes
Accelerate Satellite Development	74	Mitigate cost and schedule risk for existing satellite program	No	Yes	Yes
Other Remaining Facility Construction, Maintenance, and Repair	27	Support repairs to specific facilities; comply with building codes; support satellite missions	No	Yes	Yes
NEXRAD Radar Systems & Dual Polarization	7	Significant improvement in precipitation estimation and distinction; general improvement in data quality	Yes	Yes	Yes
<b>Total</b>	<b>\$600</b>				

Source: OIG analysis of NOAA data

NIST and NOAA officials point out that in general, outcome-oriented performance measurement is challenging, especially with research activities and projects such as office construction. A senior NOAA official noted that the bureau concentrates on monitoring construction schedules, stating that “[NOAA] focuses appropriately on schedule and risk,” given the short time frame in which to spend the Recovery Act funds. One official contended that the OMB guidance related to measuring outcomes for this type of activity in 2 years was “un-executable” and that delivering Recovery Act projects on time and under cost should be the priority in the short term.

NIST officials explained the difficulty in developing outcome-oriented metrics for research organizations, and cited a 2008 National Research Council (NRC) report that found that measuring research efficiency based on “ultimate outcomes” is neither achievable nor valid. The report, however, endorsed evaluating efficiency based on “intermediate outcomes” (see box).

NIST worked to improve its GPRA performance measures related to several Recovery Act programs for NIST’s 2011 Congressional Budget Submission, which is a positive step.<sup>12</sup> Considerable additional work remains, however, for NIST (and NOAA) to develop outcome-oriented measures for Recovery Act investments so that they are more useful to all stakeholders, not only to internal ones such as project managers and senior accountability officials.

We agree that program efficiency is an important outcome measure, but note the bureaus must equally consider and measure program effectiveness.<sup>13</sup> Other than measuring jobs, NIST and NOAA do not evaluate the public benefits of these funds. For example, if NOAA contracts to

**Research Investments:  
Outcomes and Efficiency**

In 2008, the Environmental Protection Agency sponsored a National Research Council study due to the Environmental Protection Agency’s “difficulties in answering [OMB’s] questions about efficiency and *OMB’s insistence that the agency find ways to measure the efficiency of its research based on outcomes, rather than outputs . . .*” [emphasis added].

NRC found that measuring research efficiency “based on outcomes ... is neither achievable nor valid, because such outcomes occur far in the future and are highly dependent upon actions taken by many other people who may or may not use the research findings.” The report does, however, recommend evaluating efficiency based on “intermediate outcomes”— assessing, for example, whether a program has improved the body of knowledge for decision-making, or disseminated newly developed tools and models.

Source:  
[www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12150](http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12150)

<sup>12</sup>NIST updated its performance metrics related to the following programs: Measurement Science and Engineering Grants, Post-doctoral Research Fellowships, and Measurement Science and Engineering Fellowship Program. For example, NIST fellowship programs measure outputs of “knowledge transfer” such as the number of reports or the number of times a report is referenced by another researcher. Compared with measuring obligation percentage rates, measuring such outputs is relevant, and is important progress toward measuring outcomes.

<sup>13</sup>NRC conducts a yearly assessment focusing on quality, relevance, and technical merit of the NIST Laboratories Program. As a result of its efficiency evaluation, this year NRC will conduct an assessment of four NIST laboratories, last assessed in 2008. NRC assessment reports are available at [www.nist.gov/director/nrc](http://www.nist.gov/director/nrc).

build a research facility or to construct a research vessel or if NIST provides for research fellowships or purchases highly technical scientific equipment with Recovery Act funds, the scientific improvements or public benefits of these tax dollar investments should be identified. If NOAA and NIST do not do so, the bureaus cannot accurately measure the effectiveness of Recovery Act programs.

### **Recommendation**

NOAA and NIST should improve their performance metrics for the more significant Recovery Act programs, focusing on intermediate outcomes that assess the programs' benefits. For example, performance metrics should track whether an investment has improved the body of knowledge in a particular field, disseminated newly developed tools and models, supported a research or technological innovation, or made other advancements in science and technology for the public's benefit.

### **Summary of Bureaus' Comments**

NOAA's April 22 response to our draft report says that NOAA agrees with the report and has already begun to modify its Recovery Act performance metrics to address the report's recommendation. NIST's May 14 response reemphasized the challenges we discussed in the report regarding measuring core science programs. However, NIST agreed that its performance metrics for the STRS equipment program should be strengthened, and stated that it would develop an appropriate set of intermediate measures.